



A.D. 1853. N^o 1790.

SPECIFICATION

OF

JOHN GRAY.

APPARATUS FOR CONSUMING SMOKE.

LONDON:

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James A. G.

1854.



A.D. 1853 N° 1790.

Apparatus for Consuming Smoke.

LETTERS PATENT to John Gray, of Rotherhithe, in the County of Surrey, Engineer, for the Invention of “**IMPROVED APPARATUS FOR CONSUMING SMOKE.**”

Sealed the 22nd September 1853, and dated the 1st August 1853.

PROVISIONAL SPECIFICATION left by the said John Gray at the Office of the Commissioners of Patents, with his Petition, on the 1st August 1853.

I, JOHN GRAY, do hereby declare the nature of the said Invention
5 for “**IMPROVED APPARATUS FOR CONSUMING SMOKE**” to be as follows:—

I construct the bridge behind the fire grate with a passage or passages, through which a portion of the flame or products of combustion pass from the upper surface of the fire, and with another passage or passages for the introduction of air. These last passages
10 convey the air to the first passages through which the products of combustion pass, and the air is thus mingled with the products of combustion, and escapes through one or more apertures in the bridge, and meets with the remaining portion of the products of combustion which passes over the bridge. The air may enter the bridge from the ash pit,
15 or it may be conveyed to the interior of the bridge by means of pipes,

Gray's Improved Apparatus for Consuming Smoke.

flues, hollow bricks, or other passages. By this arrangement I find that the whole or the greater part of the smoke is consumed.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said John Gray, in the Great Seal Patent Office, on the 31st January 1854.

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TO ALL TO WHOM THESE PRESENTS SHALL COME, I, JOHN GRAY, late of Rotherhithe, in the County of Surrey, but now of Peckham, in the same County, Engineer, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the First day of August, in the year of 10 our Lord One thousand eight hundred and fifty-three, in the seventeenth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said John Gray, Her special licence that I, the said John Gray, my executors, administrators, and assigns, or such others as I, the said John Gray, my executors, 15 administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "**IM- 20** PROVED APPARATUS FOR CONSUMING SMOKE," upon the condition (amongst others) that I, the said John Gray, by an instrument in writing under my hand and seal, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal 25 Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

NOW KNOW YE, that I, the said John Gray, do hereby declare the nature of the said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and 30 by the following statement thereof, reference being had to the accompanying Drawing, and to the figures and letters marked thereon, that is to say:

The Invention consists in constructing the bridges or back parts of

FIG. 1.

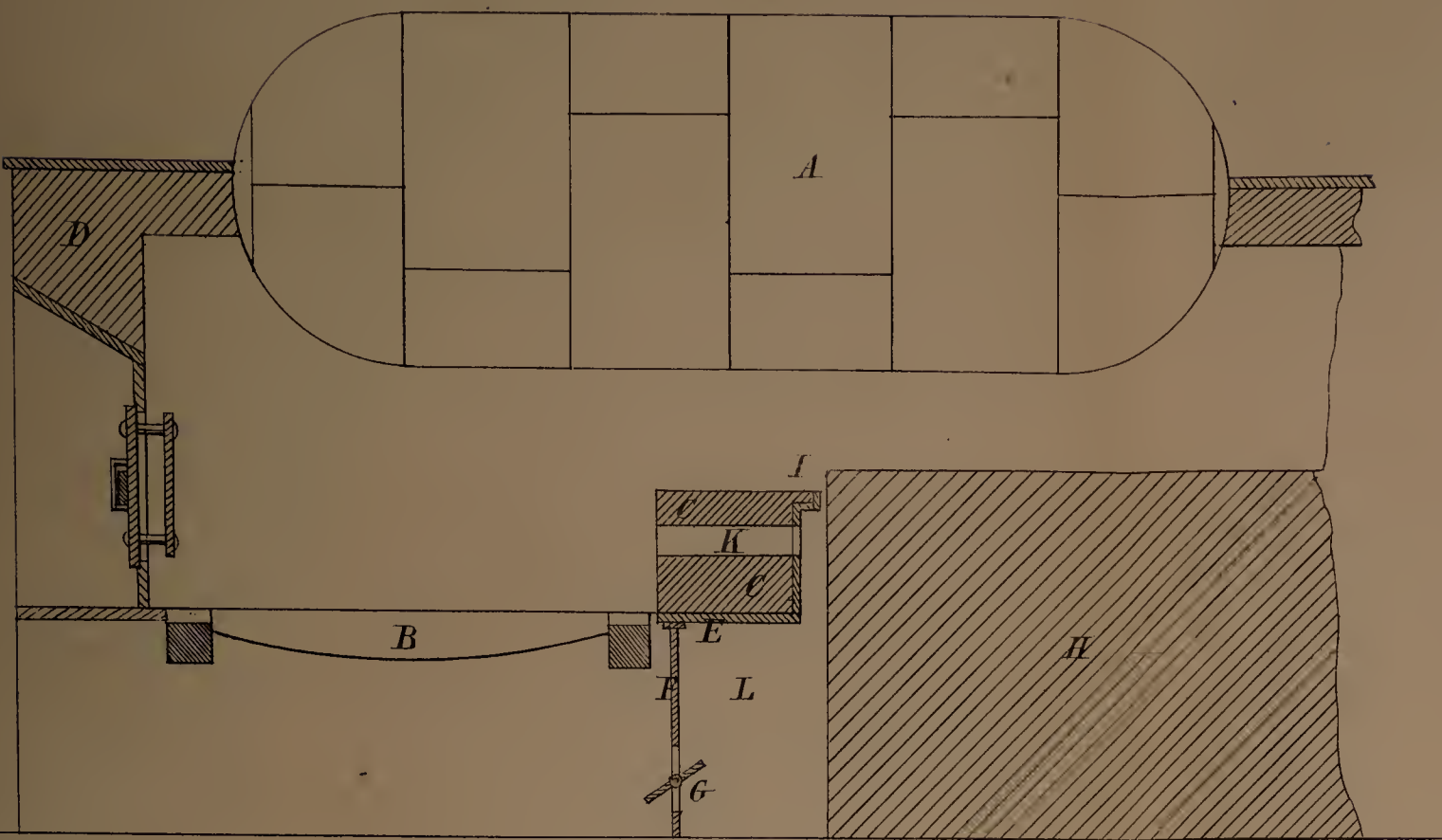


FIG. 2.

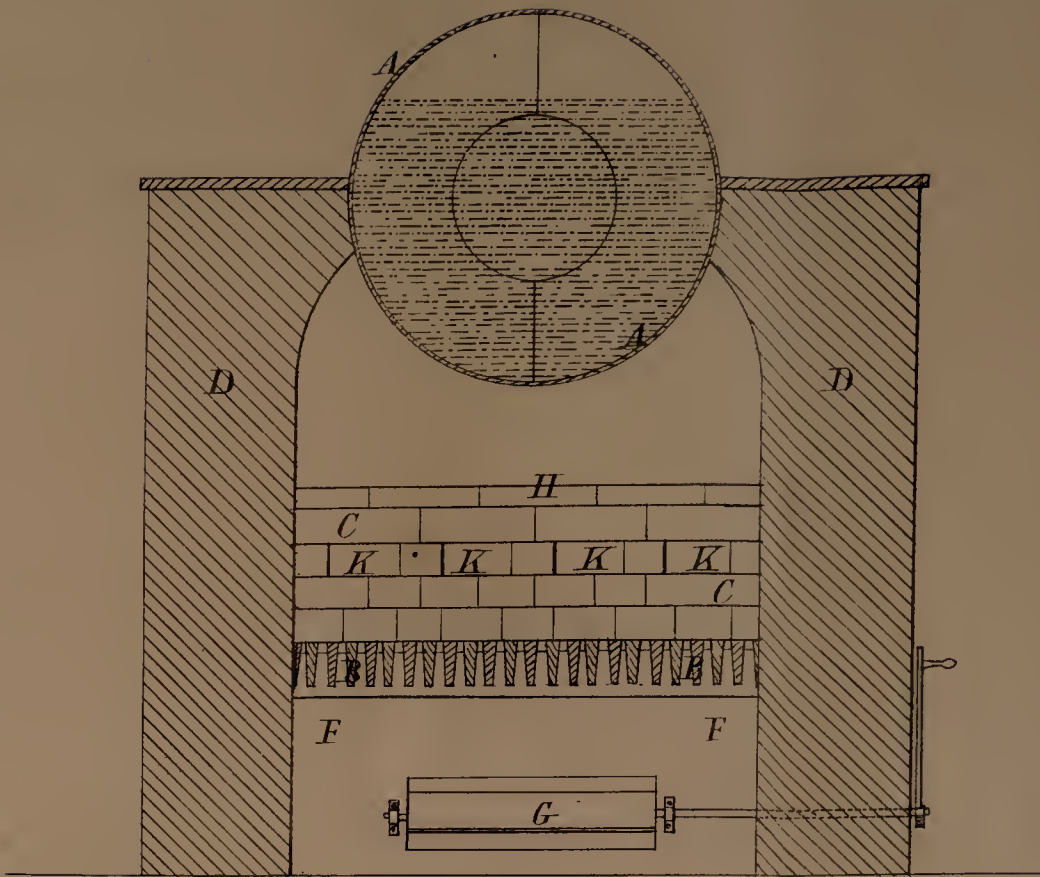


FIG. 4.

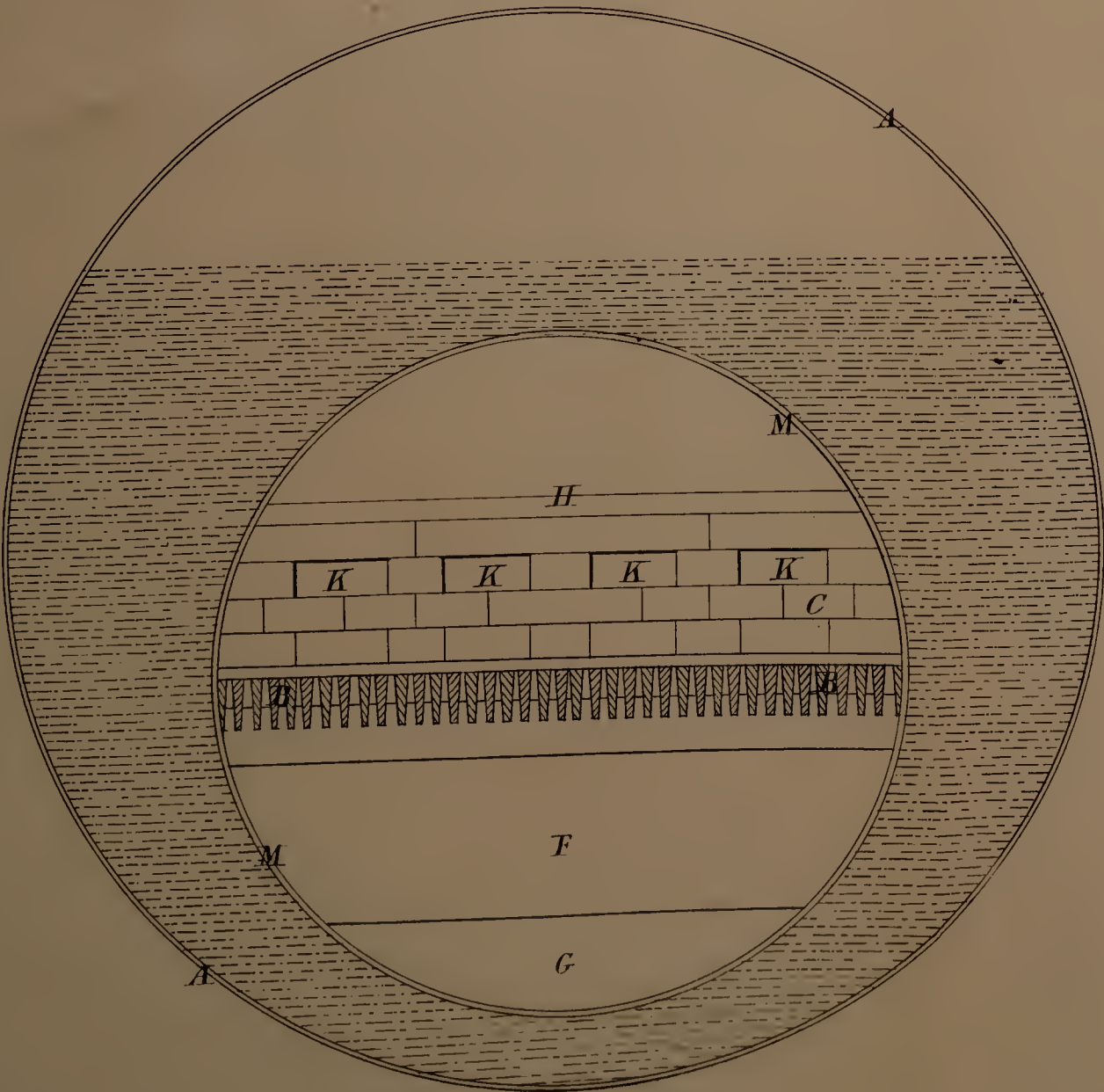
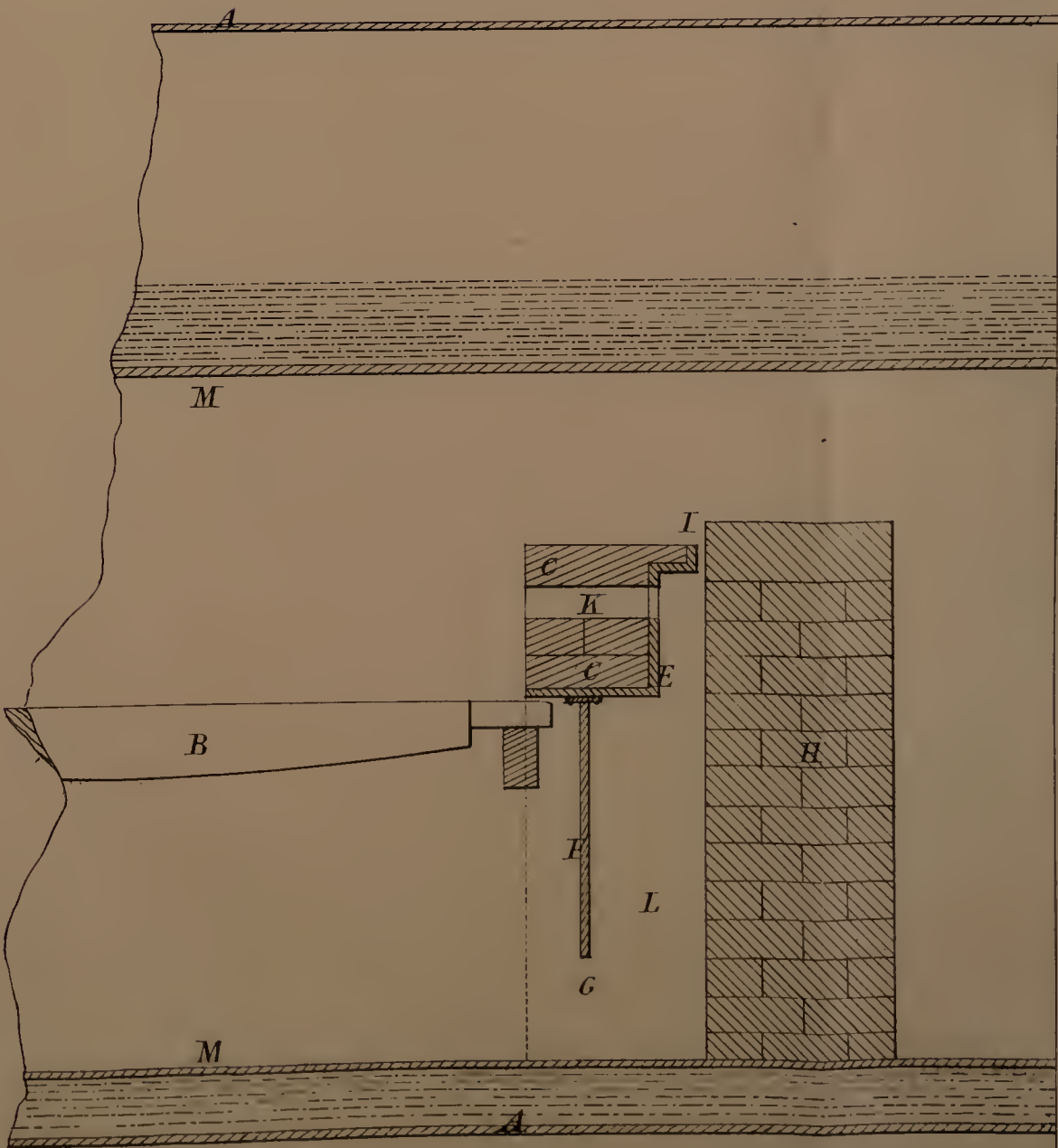


FIG. 3.



Gray's Improved Apparatus for Consuming Smoke.

furnaces with two passages or sets of passages communicating with each other, and with a common chamber or passage for the admission of air, and arranged as herein-after described.

Figure 1, is a longitudinal section, and Figure 2, is a transverse section of a furnace constructed according to my Invention, and applied to the heating of a steam boiler. The same letters refer to similar parts in each Figure. A, is the boiler; B, is the grate; and C, is the bridge; D, is the brickwork setting of the boiler.

The bridge C, is made of fire brick or other suitable material, supported on a cast iron plate E, beneath which is the vertical plate F, having an aperture with a valve or damper G. H, is a wall or mass of brickwork beyond the bridge C; and I, is a slit or series of openings between the brickwork H, and the bridge C; K, K, are other openings through the bridge into the furnace. The openings I, and K, communicate with the chamber L, into which air enters at the valve G.

The action of the apparatus is as follows:—A fire of coal is made on the grate B, and a portion of the products of combustion passes over the bridge, while another portion passes through the openings K, K, and meeting with a current of air entering at the valve G, the hot mixture so produced passes up through the slit or openings I, and meets the first portion of the products of combustion, which is passing over the bridge. The unconsumed gases are thus ignited, and I find that the combustion is more perfect than when cold air is simply admitted at the slit I, as in some of the smoke-consuming furnaces heretofore used. By opening the valve G, to its full extent a portion of the air passes through the openings K, into the furnace, the remainder passing through the slit or openings I, in which case I find it advantageous to heap up the fuel so as to partially cover the openings K, or even entirely to cover them. By this means a vivid combustion is produced at or close to the bridge, which acquires a high temperature, and the remaining unconsumed gases in their passage over the bridge come in contact with the air passing through the openings I, and become ignited.

In whichever manner my apparatus is employed it will be found that little or no smoke escapes into the chimney, and it is therefore not absolutely necessary to employ the valve G, as the opening for the admission of the air may be permanently adjusted, in the first instance,

Gray's Improved Apparatus for Consuming Smoke.

to produce the required result. Thus, in Figures 3, and 4, I have shown the apparatus constructed without the valve, and adapted to a furnace placed within a steam boiler. Figure 3, is a longitudinal section, and Figure 4, is a transverse section. A, is the outer shell of the boiler; M, is the flue or tube which contains the grate B, bridge 5 C, and wall H; E, is the plate which supports the bridge; and F, is the vertical plate beneath it. This plate does not reach to the bottom of the tube M, but is cut off to leave a space G, for the entrance of the air. The other parts are similar to those similarly marked in Figures 1, and 2. The ends of the grate bars B, pass under the plate E, 10 which arrangement is advantageous in cases in which grate bars having a reciprocating end motion are employed.

I have shewn my apparatus as adapted to steam boilers, but it is obvious that it is also applicable to brewers' coppers, bakers' ovens, reverberatory furnaces, and many other descriptions of furnaces. 15

Having now described the nature of my Invention, and in what manner the same is to be performed, I wish it to be understood that I do not claim generally the admitting of air at the bridge of a furnace; but what I claim is, the constructing the bridges or back parts of furnaces with two passages or sets of passages communicating with 20 each other and with a common chamber or passage for the admission of air, and arranged in manner herein-before described.

In witness whereof, I, the said John Gray, have hereunto set my hand and seal, this Thirty-first day of January, in the year of our Lord One thousand eight hundred and fifty-four. 25

JOHN GRAY. (L.S.)

Witness,

CHARLES COWPER,

20, Southampton Buildings,

Chancery Lane.

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Printers to the Queen's most Excellent Majesty. 1854.